

## PATENT

Atty. Dkt. No. APPM/3778/CMP/CMP/RKK

**LISTING OF CLAIMS:**

1. (Previously Presented) An apparatus, comprising a semiconductor polishing device having a first surface defining at least two non-intersecting fluid retaining grooves at least a portion of which is oriented at an angle relative to a radial line originating at a center of the semiconductor polishing device, wherein the non-intersecting fluid retaining grooves are adapted to flow a fluid inwardly toward a center portion of the semiconductor polishing device.
2. (Original) The apparatus of claim 1, wherein the semiconductor polishing device is one of a polishing pad and a platen.
3. (Previously Presented) The apparatus of claim 1, wherein a depth of at least one of the non-intersecting fluid retaining grooves changes along a length of the at least one non-intersecting fluid retaining groove.
4. (Previously Presented) The apparatus of claim 1, wherein at least one of the non-intersecting fluid retaining grooves has a first portion and a second portion having a same direction of curvature and defining a tangent point to the radial line.
5. (Previously Presented) The apparatus of claim 1, wherein the non-intersecting fluid retaining grooves are oriented in a direction of rotation moving at an increasing radius from a first end of the grooves to a second end of the grooves.
6. (Previously Presented) The apparatus of claim 1, wherein the non-intersecting fluid retaining grooves are oriented in a direction of rotation moving at an increasing radius along a length of the non-intersecting fluid retaining grooves.
7. (Previously Presented) The apparatus of claim 1, wherein the non-intersecting fluid retaining grooves are selected from arcuate grooves, linear grooves, and any combination thereof.

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8. (Previously Presented) The apparatus of claim 1, wherein the non-intersecting fluid retaining grooves extend from the center portion of the semiconductor polishing device to an edge of the semiconductor polishing device and wherein no point of the non-intersecting fluid retaining groove is tangent to the radial line.

9. (Original) The apparatus of claim 1, wherein the semiconductor polishing device is adapted for use with a rotary polisher.

10. (Original) The apparatus of claim 1, wherein the semiconductor polishing device is adapted for use with a linear polisher.

11. (Original) The apparatus of claim 1, wherein the semiconductor polishing device is a polishing pad and the first surface is a polishing surface.

12. (Original) The apparatus of claim 1, wherein the semiconductor polishing device is a platen and the first surface is a polishing pad mounting surface.

13. (Original) The apparatus of claim 1, wherein the semiconductor polishing device is a platen and the first surface is a polishing pad mounting surface having a perforated pad disposed thereon, wherein a plurality of perforations formed in the perforated pad couple the non-intersecting fluid retaining groove with a polishing surface of the perforated pad.

14. (Cancelled)

15. (Currently Amended) ~~The substrate polishing pad of claim 14, A substrate polishing pad, comprising:~~

- (a) a polishing surface on a first side of the substrate polishing pad; and
- (b) a mounting surface on a second side of the substrate polishing pad.

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wherein at least one of the polishing surface and the mounting surface has a plurality of non-intersecting fluid retaining grooves formed therein, wherein the grooves are disposed so that upon a given direction of movement of the substrate polishing pad a fluid disposed in the grooves is urged to flow from an outer portion toward a center portion of the substrate polishing pad, wherein the one or more fluid retaining grooves extend from the center portion of the substrate polishing pad to an edge of the substrate polishing pad, and wherein no point of the grooves is tangent to a radial line extending from a center to the substrate polishing pad.

16. (Currently Amended) ~~The substrate polishing pad of claim 14, A substrate polishing pad, comprising:~~

- (a) a polishing surface on a first side of the substrate polishing pad; and
- (b) a mounting surface on a second side of the substrate polishing pad,

wherein at least one of the polishing surface and the mounting surface has a plurality of non-intersecting fluid retaining grooves formed therein, wherein the grooves are disposed so that upon a given direction of movement of the substrate polishing pad a fluid disposed in the grooves is urged to flow from an outer portion toward a center portion of the substrate polishing pad, and wherein the grooves are formed on the mounting surface and the substrate polishing pad comprises perforations extending between the polishing surface and the mounting surface.

17. (Cancelled)

18. (Cancelled)

19. (Original) An apparatus for polishing a substrate, comprising:

- (a) one or more rotatable platens;
- (b) a motor coupled to the rotatable platens;
- (c) one or more polishing heads rotatably mounted in facing relation to the rotatable platens; and
- (d) a polishing pad disposed on each of the rotatable platens,

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wherein at least one of the rotatable platens and the polishing pads comprise a plurality of non-intersecting fluid retaining grooves formed on a first surface thereof and wherein at least a portion of the grooves are disposed at an angle to a radial line extending from a center of the first surface and are adapted to flow a fluid inwardly from an outer portion to a center portion of the first surface.

20. (Original) The apparatus of claim 19, wherein the plurality of non-intersecting fluid retaining grooves comprise a plurality of arcuate grooves extending from the center portion to the outer portion.

21. (Original) The apparatus of claim 19, wherein the plurality of non-intersecting fluid retaining grooves are selected from the group of arcuate grooves, linear grooves and any combination thereof.

22. (Original) The apparatus of claim 19, wherein the plurality of non-intersecting fluid retaining grooves is selected from the group of:

- (a) arcuate grooves;
- (b) linear grooves disposed in an angular relation to the radial line; and
- (c) a combination of (a) and (b).

23. (Original) The apparatus of claim 19, wherein the first surface is a platen mounting surface of the polishing pad in mating abutment with a pad mounting surface of the platen and further comprising a plurality of holes formed through the polishing pad and coupling the plurality of non-intersecting fluid retaining grooves with a polishing surface of the polishing pad.

24. (Original) The apparatus of claim 19, wherein the first surface is a pad mounting surface of the platen in mating abutment with a platen mounting surface of the polishing pad and further comprising a plurality of holes formed through the polishing pad and coupling the plurality of non-intersecting fluid retaining grooves with a polishing surface of the polishing pad.

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25. (Original) The apparatus of claim 19, wherein the plurality of non-intersecting fluid retaining grooves is selected from the group of:

- (a) arcuate grooves;
- (b) linear grooves disposed in non-parallel relation to a radial line extending from a center of the polishing pad or platen; and
- (c) a combination of (a) and (b).

26. (Original) The apparatus of claim 19, wherein the plurality of non-intersecting fluid retaining grooves comprise a first portion oriented at a first angle greater than 0 degrees and less than 90 degrees relative to the radial line and a second portion oriented at a second angle greater than 90 degrees and less than 180 degrees relative to the radial line.

27. (Original) The apparatus of claim 26, wherein the first and second angles vary along their respective lengths.

28. (Original) A rotatable platen for a polishing system, comprising a patterned pad mounting surface forming a plurality of non-intersecting fluid retaining grooves each having a portion oriented at an angle relative to a radial line originating at a center of the pad, the portion adapted to flow a fluid inwardly from a perimeter portion to a center portion of the platen during rotation of the platen.

29. (Original) The rotatable platen of claim 28, wherein the plurality of non-intersecting fluid retaining grooves is selected from the group of:

- (a) arcuate grooves;
- (b) linear grooves disposed in angular relation to the radial line; and
- (c) a combination of (a) and (b).

30. (Original) The rotatable platen of claim 28, wherein a polishing pad is mounted on the pad mounting surface so that the polishing pad and the plurality of non-

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intersecting fluid retaining grooves form fluid passageways between the polishing pad and the platen.

31. (Original) The rotatable platen of claim 28, wherein the rotatable platen is part of a chemical mechanical polishing system.

32. (Previously Presented) An apparatus, comprising a semiconductor polishing device having a first surface defining at least one non-intersecting fluid retaining groove at least a portion of which is oriented at an angle relative to a radial line originating at a center of the semiconductor polishing device, and wherein the non-intersecting fluid retaining groove has a first portion and a second portion having a same direction of curvature and defining a tangent point to the radial line and wherein the non-intersecting fluid retaining groove is adapted to flow a fluid inwardly toward a center portion of the semiconductor polishing device.

33. (Previously Presented) The apparatus of claim 32, wherein the semiconductor polishing device is one of a polishing pad and a platen.

34. (Previously Presented) The apparatus of claim 33, wherein a depth of the non-intersecting fluid retaining groove changes along a length of the non-intersecting fluid retaining groove.

35. (Cancelled)

36. (Cancelled)

37. (Previously Presented) An apparatus for polishing a substrate, comprising:  
(a) a rotatable platen;  
(b) a motor coupled to the rotatable platen;  
(c) a polishing head rotatably mounted in facing relation to the rotatable platen; and

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(d) a polishing pad disposed on the rotatable platen, wherein a plurality of non-intersecting slurry retaining grooves are formed at an interface between the polishing pad and the rotatable platen and wherein a first portion of the grooves are oriented to flow slurry inwardly from an outer region to an interior region at the interface between the polishing pad and the respective rotatable platens for a given direction of rotation of the platen, and wherein a second portion of the grooves are oriented to flow slurry outwardly from a central region to the interior region at the interface between the polishing pad and the rotatable platen for the given direction of rotation of the platen.

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